

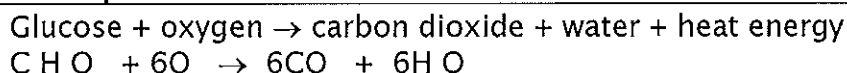
# YEAR 11 BIOLOGY UNIT 1

## FACT CHECKS

### CHAPTER 1- CELLS IN ACTION

1. The cell is the basic structural and functional unit of an organism.
2. A cell's structure is highly organised and many chemical processes and reactions occur within it.
3. Prokaryotic cells are extremely small, have simple internal structure with no membrane bound organelles, and no membrane bound nucleus.
4. Prokaryotic cells are grouped within the kingdoms Bacteria and Archaea and include cyanobacteria and bacteria.
5. Eukaryotic cells have a complex internal structure with many membrane bound organelles and a membrane bound nucleus.
6. Eukaryotic organisms are grouped within the Kingdoms Protista, Fungi, Plantae and Animalia.
7. Most cells are too small to be seen with the aid of a telescope, but some are large enough to be seen with the unaided human eye, eg. fish eggs, yolks of bird eggs, nerve cells.
8. The plasma membrane (cell membrane) is the outermost barrier of a cell and is composed of lipid molecules that are interspersed with tiny protein channels.
9. The cell wall in plant cells is composed of cellulose, a complex carbohydrate molecule.
10. Fungi have a cell wall composed of chitin.
11. The cytoplasm is the granular substance between the plasma membrane and the nuclear membrane. It is where the activities of the cell are carried out.
12. The cytoplasm is made up of a highly organised fluid material containing dissolved substances, called cytosol, and many membrane bound organelles.
13. Mitochondria are organelles within the cytoplasm that are the site of aerobic respiration releasing energy for the cell.
14. Cellular respiration is a series of chemical reactions that involve a reaction between glucose and oxygen to produce carbon dioxide, water and heat energy.

#### **15. Cellular respiration**



16. Enzymes are organic catalysts that speed up chemical reactions such as cellular respiration.
17. Ribosomes are small structures in cells that build amino acids into complex proteins.
18. Cells have a cytoskeleton that is a system of microtubules and microfilaments within a cell that supports and gives shape to it, helps movement and reproduction.
19. Microtubules are hollow cylindrical tubes in cells that act as scaffolding to determine cell shape and aid movement.
20. Spindle fibres come from microtubules, produced during cell division, and move chromosomes in precise directions.
21. Chromosomes are structures made of a DNA molecule with associated proteins.
22. The nucleus of a cell co-ordinates all of the activities.
23. DNA is the main molecule found within the nucleus and codes for the production of proteins that carry out a variety of activities within the cell.
24. The nucleolus can be found within the nucleus and is made up of protein and ribosomal RNA. It is involved in the manufacture of proteins in the cell.
25. All plants produce their own simple sugars through the chemical reactions that make up photosynthesis.
26. The energy needed to power photosynthesis comes from the sun.

27. Chloroplasts are oval shaped organelles containing green pigment called chlorophyll, which is able to absorb light energy and make it available for use in photosynthesis.

## 28. Photosynthesis

Carbon dioxide + water → glucose + oxygen + water



29. Xylem is concerned with the transport of water and mineral ions from the roots to the leaves.
30. Xylem tissue is made up of two main types of cells, the tracheids and the vessels, both of which are dead and hollow. Their walls have lignin which makes them very strong.
31. The phloem transports sugars in solution through the plant.
32. Phloem tissue consists of sieve cells and companion cells.
33. A large part of the cytoplasm in mature plant cells is composed of a fluid filled space called a vacuole, which acts as a storage space for sugars, minerals, proteins and water.
34. The type of microscope we use in the school laboratory is a light microscope. It cannot see all of the parts of a cell.
35. An electron microscope uses an electron beam instead of light and is much more powerful.

## CHAPTER 2- THE CHEMICAL COMPOSITION OF CELLS

36. Organic compounds are carbon containing molecules. Usually the carbon(C) is joined with oxygen(O), hydrogen(H) and sometimes nitrogen(N) and phosphorus(P).
37. Inorganic compounds, such as water and minerals do not contain carbon.
38. Benedict's solution tests for glucose and gives a positive change of green-orange-red.
39. Iodine solution tests for starch, positive change is dark blue.
40. Carbohydrates contain C,H, and O.
41. Examples of carbohydrates include monosaccharides (eg. Glucose), disaccharides (eg. Sucrose) and polysaccharides (eg. Starch, cellulose, glycogen).
42. Lipids contain C, H and O.
43. Proteins contain C, H, O, N and sometimes S and P.
44. Lipids form a class of compounds containing fats and oils.
45. The most common type of lipid is the triglyceride which contains three fatty acids and one glycerol.
46. Vitamins are organic molecules that are needed by the body in minute amounts.
47. Vitamins help your body grow, assist in the normal functioning of many metabolic processes and change food into energy.
48. Vitamins are either water soluble (B,C) or fat soluble (A,D,E,K).
49. Minerals are inorganic compounds present in the food we eat and incorporated into many structures of the body, such as bones, teeth and blood.
50. The building blocks of proteins are amino acids.
51. There are over 20 different types of amino acids and they join together to form a protein of polypeptide. It is the order and number of amino acids that make different types of proteins. The ordering of amino acids in proteins is determined by the genes in our chromosomes.
52. Most of the amino acids for protein production are produced by our body- non-essential amino acids.
53. There are 8 essential amino acids which must be taken in our diet because the body can not manufacture these ones.
54. Membrane proteins control movement of substances into and out of organelles and between the cell and its external environment.

55. Structural proteins include keratin found in hairs, feathers, nails, hooves and horns. Collagen is also found in bones, cartilage, tendons, ligaments, connective tissue and skin.
56. Enzymes are proteins that are catalysts, that is, they speed up chemical reactions as well as controlling them.
57. Intracellular enzymes occur inside cells, where they speed up and control metabolic reactions.
58. Extracellular enzymes are produced by cells but achieve their effects outside the cell: they include digestive enzymes, which break down food in the gut.
59. Enzymes work very rapidly.
60. Enzymes are not destroyed or altered by the reactions they catalyse, so they can be used again.
61. Enzymes can work in either direction as metabolic reactions are generally reversible.
62. Enzymes are affected by temperature and have an optimal range in which they operate. At very high temperatures they are denatured.
63. Enzymes are sensitive to pH and each one has its own range of pH in which it functions best.
64. Enzymes are usually specific to particular reactions. Normally, a given enzyme will catalyse only one reaction.
65. Substrates are substances that enter a reaction (also called reactants)
66. Products are substances at the end of a metabolic reaction.
67. Denature describes a protein, the structure of which has been altered so that it no longer functions in the way it was meant to.
68. Enzymes have an active site on their surface to which a specific substrate molecule will become attached. This model of enzyme action is known as the lock-and-key mechanism.
69. Carbohydrates are members of a large group of molecules that contain the elements carbon, hydrogen and oxygen.
70. The carbohydrate glucose is the most common single sugar molecule and is known as a monosaccharide. (C H O ).
71. The original source of all glucose molecules is photosynthesis.
72. If two monosaccharide molecules join together, they form a disaccharide, eg. Sucrose.
73. If many monosaccharides join together, they form a polysaccharide. Cellulose found in plant cell walls, is composed of many glucose molecules joined together.
74. Starch is also a plant polysaccharide and is stored in roots and is broken down into glucose when the plant requires it for respiration.
75. Animals store excess carbohydrates in the form of glycogen. It is stored in the liver and muscles and is converted back into glucose as the concentration in the blood begins to drop.
76. The cytoplasm of cells is mainly water (80% in ours) and will die if they lose too much water. All chemical reactions that take place inside cells do so in aqueous solution.
77. Inside the mitochondria cellular respiration takes place. Glucose molecules combine with oxygen and are broken down into carbon dioxide and water. Along the way, energy is released from the chemical bonds in the glucose molecule. This energy is stored temporarily in a chemical called ATP (adenosine triphosphate). When a cell requires instant energy, it is the ATP molecule that is broken apart to supply it.
78. The endoplasmic reticulum is a series of interconnected canals that transport material throughout the cytoplasm.
79. Rough endoplasmic reticulum is studded with ribosomes, which produce proteins.
80. DNA is deoxyribonucleic acid, a compound found mainly in the nucleus of eukaryotic cells. The structure of DNA is a double helix.
81. A segment of DNA is called a gene, and a gene is a chemical code for a protein, usually an enzyme.

82. RNA (ribonucleic acid) functions in transcribing and translating information from DNA into proteins.
83. Green of plants is due to the pigment chlorophyll and it absorbs the red and violet lights most strongly.

### **CHAPTER3- TRANSPORT ACROSS PLASMA MEMBRANES**

84. The internal environment of a cell is regarded to be all the material contained within its plasma membrane.
85. Extracellular fluid bathes the outside of the plasma membrane, providing the liquid medium through which nutrients are supplied and wastes removed. This is the external environment.
86. Membranes of cells and organelles have special properties to regulate which substances enter and leave.
87. All membranes are made up of a double layer of phospholipid molecules, the phospholipid bilayer.
88. Transport proteins have openings on both sides of the cell membrane, forming channels that allow some substances to move through.
89. Receptor proteins bind hormones and other substances that cause changes to the cell's activities. Different types of cells have different receptor proteins, enabling them to carry out different functions.
90. Recognition proteins attach to carbohydrate molecules and act as antigens which allow the immune system to distinguish between the body's cells and foreign invaders.
91. Substances pass in and out of cells by four main processes- diffusion (passive transport), osmosis (passive transport), active transport and endocytosis and exocytosis.
92. Movement of materials across a membrane without requiring energy is called passive transport. This type of movement relies on a process called diffusion.
93. Diffusion is the net movement of particles from a region where they are at a high concentration to a region where they are at a lower concentration.
94. Concentration gradient is the difference in concentration between two regions.
95. Equilibrium is the point at which particles are distributed evenly throughout a system; they move at equal rates in all directions.
96. Diffusion rate will increase by having a greater concentration gradient, applying heat, having smaller molecules, or movement through a gaseous solution.
97. Osmosis is defined as the net movement of a solvent, usually water, from the side of a membrane where there is a weak or dilute solute concentration to the side where there is a high solute concentration. (water movement is occurring down a concentration gradient).
98. Impermeable is unable to pass through.
99. Osmotic pressure is the pressure needed to prevent osmosis occurring; the higher the pressure, the more likely that water will diffuse in.
100. Isotonic is a fluid with an equal concentration to another fluid; water diffuses equally in both directions.
101. Hypotonic is a solution with a lower solute concentration compared with another solution.
102. Hypertonic is a solution with a higher solute concentration compared with another solution.
103. Turgid is when so much water is taken into a plant cell that the cell wall stretches, causing the cell to be swollen and rigid, which helps support them and maintain their shape and form.
104. Flaccid describes the condition of plant cells that have lost water; the cytoplasm pulls away from the cell wall.
105. Active transport is the movement of molecules or ions through a membrane against a concentration gradient.

106. Phagocytosis is the bulk transport of solid materials into a cell. Eg. A white blood cells called macrophages engulf bacteria and other foreign bodies.
107. Pinocytosis occurs when a cell's plasma membrane engulfs a drop of extracellular fluid. Eg. Fat droplets found in the small intestine after a meal, move into cells by means of pinocytosis.
108. A cell is limited to the size to which it can grow because it needs to have sufficient surface area to its volume so diffusion of substances can take place readily.
109. Mitosis is the process of cell division that forms two new daughter cells exactly the same genetically as the original cell.
110. Mitosis is used for growth, repair, replacement and asexual reproduction.
111. The phases of mitosis are Interphase, prophase, Metaphase, Anaphase and Telophase.
112. Bacteria reproduce by binary fission, which produces two new daughter cells with the same number of chromosomes as the parental cell.
113. Stem cells, found in bone marrow are unspecialised, immature cells that can be transformed into many different kinds of specialised, differentiated cells.

## YEAR 11 BIOLOGY UNIT 1 EXAM REVISION

**EXAM- 25 multiple Choice (25 marks), 6 short answer questions (55 marks). Total 80 marks. You need to attempt all questions. Do not leave any multiple choice questions unanswered. You need to make sure you use your reading time wisely. You will have a multiple choice question book and an answer book. Read all information given. It will give clues for the answer.**

### CELLS

1. Do you know the structure and function of these cell parts?  
Cell walls, chloroplasts, ribosomes, mitochondria, endoplasmic reticulum, golgi apparatus, plant vacuole, cell membrane, cell wall, nucleus, nucleolus. Which ones can be seen with a light microscope?
2. Differences and similarities between **prokaryotic** and **eukaryotic** cells. What do they contain?
3. What are **enzymes**? How are they named?
4. Differences and similarities between plant and animal cells.
5. **Aerobic respiration** and the word equation.
6. Why are cells restricted to being very small in size?
7. What are the meanings of the terms: pinocytosis, phagocytosis, endocytosis, exocytosis.
8. Structure of the cell membrane. How is the **lipid bilayer** arranged.

### PLANTS

9. Structure and function of the vascular tissue (**xylem** and **phloem**).
10. Process of water and minerals entering the roots. Definition of **osmosis** and **diffusion**.
11. Definitions of: stomata, root hairs, transpiration, translocation
12. **Mitosis**? Where would this occur in a plant?
13. What is **photosynthesis**? Write a word equation. What characteristics enhance the rate of photosynthesis? Meanings of Autotrophic and Chemosynthesis?

### CIRCULATORY SYSTEM

14. What are its functions? What are the components?
15. Know the structure of the **heart**. (right and left atrium, right and left ventricles and where the valves are located- label them on a heart) Blood vessels entering and leaving the heart (aorta, vena cava, pulmonary vein and artery)
16. **Blood vessels** (veins, arteries and capillaries) structure and function?
17. **Function** and **structure** of red blood cells?
18. What is the **lymphatic** system? What does it contain and what doesn't it contain?

### RESPIRATORY SYSTEM

19. Where does gas exchange take place in mammals? Explain this process?
20. How does air move through the lungs? Trachea, bronchus (bronchi, bronchioles, alveoli)
21. What are the characteristics of a respiratory surface?

### DIGESTIVE SYSTEM

22. **Heterotrophic**?
23. What is the function of the **caecum** in animals?
24. What do the following terms mean? Villi, peristalsis,
25. What is the structure and function of the stomach, small intestine, pancreas?

### REPRODUCTION

26. What are the **two** types of reproduction? What is the result of each one? What is the advantage of each one?
27. What are some examples of **asexual** reproduction?
28. What types of organisms carry out **sexual** reproduction?
29. What are the meanings of? Gametes, **mitosis** (+diploid), **meiosis** (+haploid) and DNA, fertilisation, vagina, cervix, uterus, fallopian tube, ovary, external and internal fertilisation, gonads,
30. Reproduction in **flowers**? Stamen, anther, stigma, carpel,

## UNIT 2 BIOLOGY EXAM REVISION 2006

**NOTE-** The exam has 25 Multiple Choice Questions (25 marks) and 8 Short Answer Questions (50 marks). When doing all questions **underline what is important** and work out carefully **what the question is asking**. The questions are not to trick you. Many are just using **common sense**. **Think!** Do not spend too long on the Multiple Choice (no longer than 45 minutes).

### CHAPTER 7- ENVIRONMENTAL FACTORS AND THEIR INFLUENCE

- What are abiotic factors? (temperature, light, rainfall, humidity, salinity, concentration of gases, pH, nutrients). Biotic factors? (humans, competitors, collaborators, predators, parasites/disease) Give examples of each.
- What are tolerance limits? Tolerance range? Optimum range? What might affect an organism's distribution?
- What are adaptations? (structural, physiological, behavioural) What adaptations do organisms have for a range of habitats? Give examples of leaf characteristics that are adaptations for particular factors. (p.211)
- What is phototropism (p.226)

### CHAPTER 8- REGULATION AND CONTROL

- What is homeostasis?
- What two systems are responsible for homeostasis in animals?
- What type of nervous system do simple animals have?
- Know how the nervous system of complicated animals works. Nerve cells- what do they look like? What are the following terms? Stimulus, receptors, sensory neuron, central nervous system, motor neuron, effector.
- What is a reflex arc? Why is a simple pathway needed?
- How do organisms maintain thermoregulation? External temperature increases (increased surface area, burrow/shade, panting/ sweating, vasodilation) adaptations (fur, feathers, fat, shape and size, countercurrent heat exchange) External temperature decreases (insulation, shivering, vasoconstriction)

### CHAPTER 9- BEHAVIOURAL AND REPRODUCTIVE ADAPTATIONS

- Types of reproductive behaviour

### CHAPTER 10- RELATIONSHIPS AND POPULATIONS

- What is an ecosystem?
- What is the definition of a community? (Members of the community include competitors, collaborators, predators, prey).

- ❑ Niche- What forms an organism's niche?
- ❑ Symbiotic relationships (commensalism, mutualism, parasitism)
- ❑ Control of populations (chemical, biological, culling)
- ❑ Naming ecosystems.

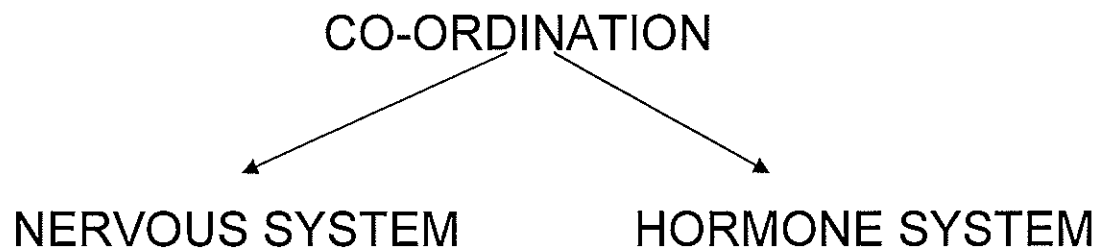
## **CHAPTER 11- ECOSYSTEMS; ENERGY AND MATTER**

- ❑ ENERGY- Radiant energy from the sun → plants, algae and cyanobacteria → autotrophs (producers) PHOTOSYNTHESIS (equation)
- ❑ Where does the energy go? What is it used for?
- ❑ Herbivores (1<sup>st</sup> order consumers)
- ❑ Carnivores (2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> order consumers)
- ❑ What are trophic levels?
- ❑ What is trophic efficiency? 90% energy loss- where to? (movement, keeping warm, gamete production, synthesis of new tissue.
- ❑ What are food chains? Food webs?
- ❑ What is the role of decomposers in the ecosystem? What are examples?
- ❑ Understand the basis of – **the carbon cycle** (photosynthesis and respiration)
- the nitrogen cycle** (nitrogen fixation, nitrifiers, denitrifiers)
- ❑ What is biomass? Which trophic levels have the greatest amount?
- ❑ What are pyramids of numbers, biomass and energy?
- ❑ What is GPP and NPP? Which ecosystems have the greatest GPP?

## **CHAPTER 12- CHANGE OVER TIME**

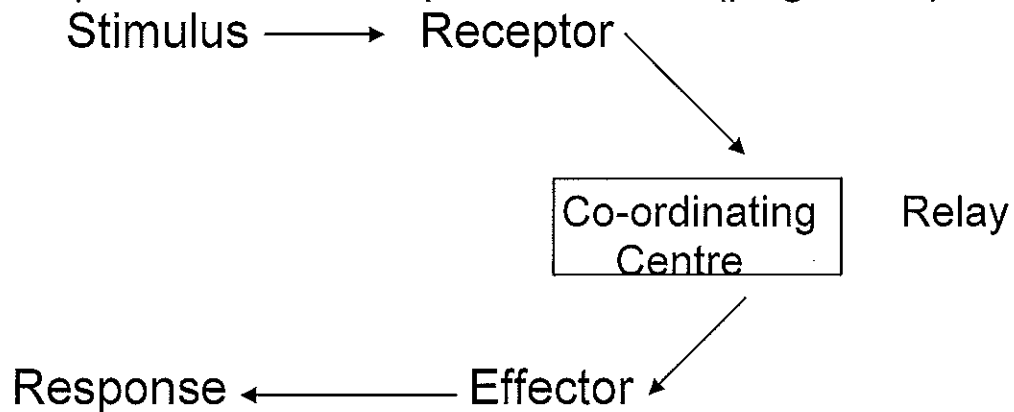
- ❑ What are primary succession, secondary succession, climax communities? Give examples.
- ❑ What is biomagnification? Who is affected most by biomagnification? Explain.
- ❑ What is salinity and what causes it? What are solutions to salinity?
- ❑ What is biodiversity and why is it important?
- ❑ What is habitat fragmentation? (note- study your Chapter 12 summary sheet on this section).





## **NERVOUS SYSTEM**

- A simple stimulus- response model (page 243)



- What is a reflex arc? Why are these important to animals? What would happen if there was an interruption in the spine?